

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1-24 (canceled)

25. (new) A polyepitope from an E6 protein of human papillomavirus (HPV), comprising a peptide sequence wherein the number of amino acids is greater or equal to 17, and less or equal to 30, said peptide sequence contains amino acid sequences of at least 5 different epitopes binding stably to HLA molecules of identical or different type, so that at least 6 HLA molecules of different types bind to these epitopes, said HLA molecules are selected from the group consisting of A1, A2, A3, A11, A24, A29, B7, B8, B18, B27, B35, B44 and B51, and wherein an epitope binding to HLA molecule of type B35, and an epitope binding to HLA molecule of type B44, and an epitope binding to HLA molecule of type B51 are present, said polyepitope is selected from the group consisting of :

* a polyepitope of the E6 protein of HPV comprising 30 amino acids delimited by the amino acids located in positions 15 and 44 of the peptide sequence of the E6 protein of HPV, and characterized by the peptide sequence SEQ ID NO: 4 as follows:

(15)RPRKLPQLCTELQTTIHDIILECVYCKQQL(44)

said peptide sequence comprises 9 epitopes binding stably to at least one of the 8 HLA molecules of the following types: A2, A11, A29, B7, B8, B35, B44, or B51, said epitopes being the following:

-(15)RPRKLPQL(22) binding stably to HLA molecules of the B7 or B35 type,

-(18)KLPQLCTEL(26) binding stably to HLA molecules of the A2 type,

-(19)LPQLCTEL(26) binding stably to HLA molecules of the B51 type,

-(21)QLCTELQTTI(30) binding stably to HLA molecules of the A2 type,

-(24)TELQTTIHDI(33) binding stably to HLA molecules of the A29 or B44 type,

-(29)TIHDIILRCV(38) binding stably to HLA molecules of the A2 type,

-(33)IILECVYCK(41) binding stably to HLA molecules of the A11 type,

-(35)LECVYCKQQL(44) binding stably to HLA molecules of the A29 or B44 type, and

-(37)CVYCKQQL(44) binding stably to HLA molecules of the B8 type;

* a polyepitope of the E6 protein of HPV comprising 17 amino acids delimited by amino acids located in positions 46 and 62, or to 22 amino acids delimited by amino acids located in positions 46 and 67 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 6 as follows:

(46) RREVDFAFRDLCIVYRDGNPY (67)

said peptide sequence contains 6 epitopes binding stably to at least one of the 10 HLA molecules of the following types: A2, A3, A11, A24, A29, B7, B27, B35, B44, or B51, said epitopes being the following:

- (46)RREVDFAFR(55) binding stably to HLA molecules of the B27 type,
- (49)VYDFAFRDL(57) binding stably to HLA molecules of the A24 type,
- (50)YDFAFRDL(57) binding stably to HLA molecules of the A29 or B44 type,
- (52)FAFRDLCIV(60) binding stably to HLA molecules of the A2, B35, B51, or B7 type,
- (54)FRDLCIVYR(62) binding stably to HLA molecules of the A3 or A11 type, and
- (59)IVYRDGNPY(67) binding stably to HLA molecules of the A3 or A11 type;

* a polypeptide of the E6 protein of HPV comprising 29 amino acids delimited by the amino acids located in positions 80 and 108 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 8 as follows:

(80)ISEYRHYCYSLYGTTLEQQYNKPLCDLLI(108)

said peptide sequence containing 6 epitopes binding stably to at least one of the 10 HLA molecules of the following types: A1, A3, A11, A24, A29, B7, B18, B35, B44, or B51, said epitopes being the following:

-(80)ISEYRHYCY(88) binding stably to HLA molecules of the A1 or B18 type,

-(81)SEYRHYCY(88) binding stably to HLA molecules of the A29 or B44 type,

-(87)CYSLYGTTL(95) binding stably to HLA molecules of the A24 type,

-(94)TLEQQYNK(101) binding stably to HLA molecules of the A3 or A11 type,

-(95)LEQQYNKPL(103) binding stably to HLA molecules of A29 or B44 type, and

-(101)KPLCDLLI(108) binding stably to HLA molecules of the B7, B35 or B51 type;

and

* a polyepitope of the E6 protein of HPV comprising 22 amino acids delimited by the amino acids located in positions 118 and 139 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 10 as follows:
(118)CPEEKQRHLDDKKQRFHNIRGRW(139)

said fragment containing 6 epitopes binding stably to at least one of the 7 HLA molecules of the following types: A24, B8, B18, B27, B35, B44, or B51, said epitopes being the following:

- (118)CPEEKQRHL(126) binding stably to HLA molecules of the B8, B18, B35, B51 type,
- (119)PEEKQRHL(126) binding stably to HLA molecules of the B44 type,
- (127)DDKKQRFHNI(135) binding stably to HLA molecules of the B8 type,
- (128)KKQRFHNIR(136) binding stably to HLA molecules of the B27 type,
- (130)QRFHNIRGRW(139) binding stably to HLA molecules of the B27 type, and
- (131)RFHNIRGRW(139) binding stably to HLA molecules of the A24 type.

26. (new) The polyepitope according to claim 25, wherein said polyepitope is a polyepitope of the E6 protein of HPV comprising 30 amino acids delimited by the amino acids

located in positions 15 and 44 of the peptide sequence of the E6 protein of HPV, and characterized by the peptide sequence SEQ ID NO: 4 as follows:

(15)RPRKLPQLCTELQTTIHDIILECVYCKQQL(44)

said peptide sequence comprises 9 epitopes binding stably to at least one of the 8 HLA molecules of the following types: A2, A11, A29, B7, B8, B35, B44, or B51, said epitopes being the following:

-(15)RPRKLPQL(22) binding stably to HLA molecules of the B7 or B35 type,

-(18)KLPQLCTEL(26) binding stably to HLA molecules of the A2 type,

-(19)LPQLCTEL(26) binding stably to HLA molecules of the B51 type,

-(21)QLCTELQTTI(30) binding stably to HLA molecules of the A2 type,

-(24)TELQTTIHDI(33) binding stably to HLA molecules of the A29 or B44 type,

-(29)TIHDIILRCV(38) binding stably to HLA molecules of the A2 type,

-(33)IILECVYCK(41) binding stably to HLA molecules of the A11 type,

-(35)LECVYCKQQL(44) binding stably to HLA molecules of the A29 or B44 type, and

-(37)CVYCKQQL(44) binding stably to HLA molecules of the B8 type.

27. (new) The polypeptide according to claim 25, wherein said polypeptide is a polypeptide of the E6 protein of HPV comprising 29 amino acids delimited by the amino acids located in positions 80 and 108 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 8 as follows:

(80)ISEYRHYCYSLYGTTLEQQYNKPLCDLLI(108)

said peptide sequence containing 6 epitopes binding stably to at least one of the 10 HLA molecules of the following types: A1, A3, A11, A24, A29, B7, B18, B35, B44, or B51, said epitopes being the following:

-(80)ISEYRHYCY(88) binding stably to HLA molecules of the A1 or B18 type,

-(81)SEYRHYCY(88) binding stably to HLA molecules of the A29 or B44 type,

-(87)CYSLYGTTL(95) binding stably to HLA molecules of the A24 type,

-(94)TLEQQYNK(101) binding stably to HLA molecules of the A3 or A11 type,

-(95)LEQQYNKPL(103) binding stably to HLA molecules of A29 or B44 type, and

-(101)KPLCDLLI(108) binding stably to HLA molecules of the B7, B35 or B51 type.

28. (new) The polyepitope according to claim 25, wherein said polyepitope is a polyepitope of the E6 protein of HPV comprising 22 amino acids delimited by the amino acids located in positions 118 and 139 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 10 as follows:

(118)CPEEKQRHLDKKQRFHNIRGRW(139)

said fragment containing 6 epitopes binding stably to at least one of the 7 HLA molecules of the following types: A24, B8, B18, B27, B35, B44, or B51, said epitopes being the following:

-(118)CPEEKQRHL(126) binding stably to HLA molecules of the B8, B18, B35, B51 type,

-(119)PEEKQRHL(126) binding stably to HLA molecules of the B44 type,

-(127)DKKQRFHNI(135) binding stably to HLA molecules of the B8 type,

-(128)KKQRFHNIR(136) binding stably to HLA molecules of the B27 type,

-(130)QRFHNIRGRW(139) binding stably to HLA molecules of the B27 type, and

-(131)RFHNIRGRW(139) binding stably to HLA molecules of the A24 type.

29. (new) The polyepitope according to claim 25, wherein said polyepitope is a polyepitope of the E6 protein of HPV comprising 17 amino acids delimited by amino acids located in positions 46 and 62, or to 22 amino acids delimited by amino acids located in positions 46 and 67 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 6 as follows:

(46) RREVDFAFRDLCIVYRDGNPY (67)

said peptide sequence contains 6 epitopes binding stably to at least one of the 10 HLA molecules of the following types: A2, A3, A11, A24, A29, B7, B27, B35, B44, or B51, said epitopes being the following:

-(46)RREVDFAFR(55) binding stably to HLA molecules of the B27 type,

-(49)VYDFAFRDL(57) binding stably to HLA molecules of the A24 type,

-(50)YDFAFRDL(57) binding stably to HLA molecules of the A29 or B44 type,

-(52)FAFRDLCIV(60) binding stably to HLA molecules of the A2, B35, B51, or B7 type,

-(54)FRDLCIVYR(62) binding stably to HLA molecules of the A3 or All type, and

-(59)IVYRDGNPY(67) binding stably to HLA molecules of the A3 or All type.

30. (new) The polyepitope according to claim 29, wherein said polyepitope is a polyepitope of the E6 protein of HPV comprising 17 amino acids delimited by amino acids located in positions 46 and 62 of SEQ ID NO: 6.

31. (new) The polyepitope according to claim 25, wherein said polyepitope is a polyepitope of the E6 protein of HPV comprising 22 amino acids delimited by amino acids located in positions 46 and 67 of SEQ ID NO: 6.

32. (new) A polyepitope comprising amino acids 46 and 62 of SEQ ID NO : 6.

33. (new) A polyepitope comprising amino acids 46 and 67 of SEQ ID NO : 6.

34. (new) A polyepitope comprising SEQ ID NO : 6.

35. (new) A polypeptide of E6 protein from HPV, comprising 17 amino acids delimited by amino acids located in positions 46 and 62, or to 22 amino acids delimited by amino acids located in positions 46 and 67 of the peptide sequence of the E6 protein of HPV, characterized by the peptide sequence SEQ ID NO: 6 as follows:

(46) RREVDFAFRDLCIVYRDGNPY (67)

said peptide sequence contains 6 epitopes binding stably to at least one of the 10 HLA molecules of the following types: A2, A3, A11, A24, A29, B7, B27, B35, B44, or B51, said epitopes being the following:

- (46)RREVDFAFR(55) binding stably to HLA molecules of the B27 type,
- (49)VYDFAFRDL(57) binding stably to HLA molecules of the A24 type,
- (50)YDFAFRDL(57) binding stably to HLA molecules of the A29 or B44 type,
- (52)FAFRDLCIV(60) binding stably to HLA molecules of the A2, B35, B51, or B7 type,
- (54)FRDLCIVYR(62) binding stably to HLA molecules of the A3 or A11 type, and
- (59)IVYRDGNPY(67) binding stably to HLA molecules of the A3 or A11 type.